

Course Syllabus

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BIOS 311 Advanced Experimental Biosciences Syllabus Spring 2021

NOTE: BIOS 311 is designated FACE-TO-FACE only and has an approved exemption from dual delivery: the hands-on lab work is an essential and valuable part of this course, and the learning value will be greatly compromised were we to offer the course in an on-line format.

LABORATORY MEETINGS

- Scheduled from 1:30-5:30 pm, in Anderson Biological Laboratories (ABL) 126; there may be times during the semester that we will meet in Zoom
 - Wednesday (section 001): begins 27-Jan-2021
 - Thursday (section 002): begins 28-Jan-2021
- Throughout semester: self-scheduled, independent team work
 - Each student needs to log at least 30 hours of project work by 23-Apr-2021
 - Lab availability outside of scheduled time for your section is variable so you will need to plan ahead and notify the TAs and instructor
 - Notify us of your experimental plans at least 24 hours in advance so we can make sure reagents/supplies and equipment are ready for your use

INSTRUCTOR

Dr. Beth Beason-Abmayr (bbeason@rice.edu (<mailto:bbeason@rice.edu>)): office hours will be conducted using Zoom – you may email me to schedule an appointment or visit during regularly scheduled office hours (the link will be posted under the Zoom tab in Canvas). When you arrive for

remote office hours, you will be directed to the waiting room; please be patient as I may be meeting with another student.

I am conducting a study looking at teaching and learning. The purpose of this study is to determine the factors that influence teaching effectiveness and learning. Your participation in this study will last for the duration of the current semester and will entail activities no different from the regular activities you would otherwise engage in as part of the course. If you would like more information, please do not hesitate to ask. *If you would like to opt out of the study, please talk to Dr. Beason as soon as possible.*

PERSONAL PROTECTIVE EQUIPMENT (PPE) & PHYSICAL DISTANCING

Before returning to Rice each of you signed a “Culture of Care Agreement” where you promised to abide by the university’s policies on PPE and physical distancing as well as other behaviors; you are expected to follow those policies at all times. Please carefully read the policies specific for this course (*also see PARTICIPATION below for additional guidelines for working in the lab*):

- Every student in the laboratory (ABL 126) is expected to properly wear a mask or face covering [[RICE CRISIS MANAGEMENT POLICIES \(https://coronavirus.rice.edu/policies\)](https://coronavirus.rice.edu/policies)] and to abide by Rice’s physical distancing policy (maintain at least six feet of distance from other persons whenever possible). In addition to a face mask, you are expected to wear a face shield at all times when working in the lab - face shields will be available for purchase during the first week of classes; you will store your face shield in a baggie in your team lab drawer.
- If you have questions during class, please get my attention and ask your question from your work station. If you have questions at the end of class, please submit them via email or attend office hours; if you email a question, I will try to answer it within 24 hours on weekdays.
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- Please leave the lab immediately after you finish your work to help reduce any crowding at the EXIT.
- I reserve the right to instruct students to leave the classroom if they are engaging in behavior that places faculty and/or students’ health at risk. If students do not comply, I may cancel the class meeting and refer the student to Student Judicial Programs and the Dean of Undergraduates.

COURSE OBJECTIVES AND LEARNING OUTCOMES

BIOS 311 further advances basic laboratory, record keeping, and technical communication skills that were introduced and/or reinforced in BIOS 211: Intermediate Experimental Biosciences. Our emphasis is on the *process* of science (i.e., fundamental abilities and skills) rather than the *content* (i.e., discipline-specific lab techniques). In this **course-based undergraduate research experience (CURE)**, **students work in teams to work on investigative, client-based projects with opportunities to design experiments, analyze data, and communicate their findings.** *Each semester the lab project focuses on protein purification and characterization; the target protein may vary from semester to semester.*

Overall learning goals and expected learning outcomes for the course are outlined below. As you look over the BIOS 311 goals and specific objectives below, please consider which areas represent your strengths, in which areas you want to strengthen your skills, and in which areas you have little or no experience. Return to this list later in the class to assess for yourself whether you are progressing towards these goals.

Goal 1: Possess laboratory skills desired of an independent researcher

Understanding the rationale behind procedures and asking questions that reflect a willingness to learn promote effective time management and successful completion of experiments. Our best students are always the ones who are engaged in the learning process. An independent researcher

- follows standard protocols to complete specific procedures
- performs logical troubleshooting of laboratory procedures
- adheres to instructions on laboratory safety, and recognizes hazardous situations and acts appropriately
- uses and stores equipment properly
- handles lab reagents and solutions sensibly
- performs basic lab calculations to prepare solutions and samples for experiments
- measures and reports uncertain quantities with appropriate precision
- applies appropriate methods of analysis to raw data
- converts raw data to a physically meaningful form with appropriate units.

Goal 2: Understand the importance of effective scientific communication

Communication and record keeping are fundamental to the dissemination of science. A student who is an effective communicator

- maintains a timely, comprehensive laboratory notebook with sufficient detail to repeat experiments, troubleshoot procedures, and analyze data
- shares information orally
- writes effectively in appropriate style and depth
- makes effective use of information resources.

Goal 3: Recognize the importance of maturity and responsibility when working in a professional environment

In addition to working independently, each student is expected to work well with each member of a team. A mature and responsible student

- employs all available resources to prepare for laboratory work
- takes the initiative to note when assignments are due and completes them on time
- follows instructions for completion of assignments and execution of lab procedures
- works independently but seeks help when appropriate
- works effectively as part of a team and divides lab responsibilities to complete work in a timely manner
- admits when mistakes or errors are made and accepts responsibility for actions
- learns from mistakes as well as successes and is open to suggestions from teammates, TAs, or the instructor
- recalls routine procedures without having to consult a teammate, TA, or instructor
- takes the initiative to refresh past understanding of methods, procedures, explanations, and theory
- shares specific observations and experiences with teammates
- when necessary, picks up responsibilities if partner is unable to carry them out.

Goal 4: Experience that not all scientific experiments work as planned and formulate a path forward

Many scientific experiments do not work as planned and often yield either no results or findings that conflict with or differ from previous experiments. Our teaching labs in BioSciences provide a "safe" and nurturing environment where a student can

- respond to questions that require troubleshooting of experimental methods or data collection
- use laboratory notes and observations to evaluate the success of experiments and identify potential errors when outcomes are unanticipated
- make corrections or alterations after missteps in experimental procedures, adjusting their

schedule or research plan appropriately

- observe how other students report errors in posters or presentations.

Goal 5: Recognize the importance of asking questions to help you understand a concept

When exploring new fields, especially those that merge disciplines (like Biology and Engineering), it is normal to feel a little lost and even overwhelmed or embarrassed. Progress may feel a little slow at the beginning of this course because you may be learning new language and techniques. A curious and motivated student

- does not hesitate to ask *any* questions during class – what you may perceive as trivial actually might not be so simple, and many others in the class likely have the same question!
- gives us feedback to help us judge how well we are communicating the material
- questions why a lab procedure is performed a certain way rather than just blindly follows a protocol.

Goal 6: Recognize appropriate context and understand how to report meaningful data

Paying attention to detail is important not only in performing experimental procedures but also in reporting the results to the scientific community and the general public. An insightful student

- recognizes the relevance of data
- relates laboratory work to the bigger picture
- recognizes the applicability of scientific principles to real world situations
- considers how seemingly minor oversights or mistakes can have serious consequences.

Goal 7: Integrate and apply knowledge/experience to current and future work

On the path to become a self-reliant critical thinker, problem solver and communicator, a student progresses through several proficiency levels. A highly proficient student recognizes when the current skill level is not adequate to handle a particularly complex problem, and effectively seeks resources to acquire the needed skill. A student's present level of achievement and success is a reflection of past experiences and opportunities that have been made available as well as self-confidence. A successful student

- retains facts, methods, and principles learned in science and math courses and applies that information to another course, even in a different discipline
- uses critical thinking in the laboratory by making observations, drawing conclusions supported by

the data, and acting upon those conclusions

- recognizes whether results and conclusions "make sense"
- figures out what "tools" to use when presented with a particular problem or task.

LAB HOURS

You are expected to complete a minimum of 30 hours of research work over the semester related to your project. You will log your hours each time you work on your project either inside or outside the lab.

You may log hours for work outside of the lab that is directly related to your project (e.g., researching the literature, developing a protocol, planning experiments, analyzing results, writing your research paper, etc.). Lab work may be completed within the scheduled course time or any other time that the lab is attended by a TA, instructor, or the Teaching Laboratory Manager; you may not work in the lab without at least one supervisor. *You are encouraged to coordinate with your team so you can work in the lab together for major experiments. It is essential to stay in communication when working separately so that you are all on the same page.*

REQUIRED TEXT AND RESOURCES

- Angelika H. Hofmann, ***Writing in the Biological Sciences: A Comprehensive Resource for Scientific Communication***, Third Edition (2019), Oxford University Press
- **Canvas**: modules, course videos, supplemental resources, pre-lab exercises and other assignments, announcements, grade postings, class calendar, and more

RECOMMENDED TEXT

- *Protein Purification: Principles and Practice*, Third Edition (1994) Robert K. Scopes (Springer-Verlag New York, Inc.)

REQUIRED MATERIALS

- Sharpie (*Extra Fine recommended*)
- face shield (*BioSciences will provide these during the first week of classes*)
- face mask (*your responsibility*)
- computer

PREPARATION AND COMMUNICATION

Each week while the course meets formally you are expected to prepare for each class discussion and laboratory session. For the detailed schedule and background/details for each class, see Canvas Modules. Homework, quizzes, reflections, and communication assignments are submitted when specified in Canvas; students will get feedback and grades on these assignments typically within a week. *Additionally, you must come to **lab** prepared* -- this requires you to READ the experimental protocols BEFORE coming to lab, not just print a copy and bring it with you or open up a web site once you get to lab.

Announcements will be sent at least once a week with important information about the course; you are expected to read these Announcements in a timely manner - Announcements are archived in Canvas so you do not have to "dig" through your inbox to locate essential information about upcoming meetings, lab work, and/or assignments.

For discussions:

- Read over the material in Canvas and any additional materials and identify any questions for the instructor
- Watch the appropriate videos (links are in Canvas Modules)
- Obtain necessary information about techniques from the resources provided
- Come to each lab prepared to answer questions and evaluate your knowledge about the techniques, safety issues, scientific theory, and experimental significance

For laboratory work:

- Read the rules for safe conduct in the laboratory (see [Lab Safety](#)) before the first lab session and be aware of special safety concerns for each lab meeting; also review [Rice_LabSafetyPolicy313.pdf](#) 
- Use resources to ensure that you know what we are doing and why we are doing it
- Prepare an outline (procedure, notes, calculations) so that you are ready to perform labwork
- Complete and submit online pre-laboratory assignments before coming to lab sessions
- Record your prelaboratory calculations in your notebook when applicable
- *Take notes in your team lab notebook using Google Docs in Canvas:* make sure you share your Google document with me so I have access to your lab notebook.

For follow-up work:

- Monitor assignment due dates in Canvas each week to ensure that you are aware of upcoming assignments

assignments

- Check Canvas frequently for new or updated class information

NOTE: Please bring your personal computer to discussion and lab with you so you will have access to assignments, procedure information, and additional resources during class (i.e., there are no handouts). Please see the course web site and Canvas for further details.

ATTENDANCE POLICIES

Attendance at all laboratory sessions and class meetings is required. You are expected to attend classes and participate in class discussions and other activities. Absences may be excused due to illness or unexpected/unavoidable emergencies; students are expected to contact the instructor by email as soon as possible in the event of illness or an emergency. Please do not come to class if you are not feeling well. Due to the unusual circumstances we are in this fall, we may need to change the typical mode of attending/delivering class during the semester - I will notify you through Canvas of any changes to the schedule and/or lab meetings.

PARTICIPATION

- Students are expected to be actively engaged in the classroom. If you are joining class remotely, please keep your video camera on and microphone muted. Use the [chat, raise hand, unmute, etc.] when you have questions or would like to participate. Students needing an accommodation for using their camera or microphone should contact me at the beginning of the semester to discuss and work out needed adjustments.
- In this course, students are expected to work in groups. When you are physically in the laboratory
 - maintain a 6-foot distance whenever possible
 - wear both a face shield and mask at all times
 - work only at designated stations/spaces
 - follow specific guidelines, such as entering/exiting the lab, washing hands, disinfecting work areas, etc.
 - use screen-share software, Google docs, Zoom breakouts, portable white boards, etc. if you need to view other students' work
 - use the "Group Homepage" in Canvas for collaborating in Google docs, uploading files, discussing issues, etc.
- Online discussions and activities are an integral portion of the course. You may be asked to engage in an offline dialogue with colleagues throughout each session as indicated in session directions.

- Active engagement is an essential component of the learning process. Participation in this lab course includes active reading and discussion within online forums and in-person laboratory activities during the week. Students are expected to log into the course at the scheduled time, monitor course discussions, and engage as appropriate for the course several times a session.

TECHNOLOGY RESOURCES

- Students must have a working computer with a video camera, speaker and a microphone, and a working internet connection that allows them to be on video. Students should test their equipment before joining class. Undergraduate students should contact the Dean of Undergraduates if they have concerns about meeting this requirement.
- This course includes hands-on activities in the lab that require unique materials, equipment, or supplies. If you are participating in class remotely during a laboratory session, communicate with your team to determine how you can contribute to the work they are doing in the lab.
- Each work station in the lab will have a document camera that connects via USB; teams will be able to use these cameras to document the work they are doing in the lab for team members who are not physically present.
- If your computer/phone has no webcam/microphone, which may be needed to complete some assignments, please let me know as soon as possible and contact the Dean of Undergraduates if you need to request support via the Access and Opportunity Portal ([HTTPS://AOP.RICE.EDU/APPLICATION](https://aop.rice.edu/application) (<https://aop.rice.edu/application>)).

ASSESSMENT AND GRADING

All work is to be completed individually unless otherwise specified. You must submit assignments in Canvas by the specified time on the due date. **For full credit, all assignments must be submitted on time. The penalty for late assignments is 10% of the total score per 24-hour period past the deadline.** Due dates for assignments are listed in Canvas; these dates are subject to change. Do not ask for an individual extension to a due date because you have a paper due, or three exams, or your computer crashed; due dates are set so that you have plenty of time to complete your work. Don't wait until the night before to start - there is no penalty for starting early. ***It is your responsibility to plan ahead.***

Although in the real world there are often no excuses, you will be given a break on assignments due to circumstances that are truly beyond your control. *Alternative due dates will be worked out with the instructor on an individual basis; it is your responsibility to contact the instructor as soon as possible*

~~instructor on an individual basis~~, it is your responsibility to contact the instructor as soon as possible to make other arrangements. Here are examples of **permissible reasons for a late submission**:

- A *serious* illness (flu is serious - upset stomach or case of the sniffles is not) or accident
- A *serious* family emergency or death (you are on your honor here)
- Other unusual circumstances may count also. For example, if the university closes due to flooding on the date the work is due.

Pre-lab exercises and Reflections are submitted in Canvas in "Quizzes": although there is no time limit for completing these, you are allowed a single submission. Please check Canvas for the Release/Due Dates; you must submit your work during this time frame to get full credit. *You must complete all of the pre-lab exercises ALONE* (i.e., do not work on the pre-lab with anyone else); you may use your class notes/web sites/Scopes, etc.; have a calculator and pen/pencil with scratch paper on hand as you answer the questions.

Contributions of assignments to the final course grade are as follows:

Assignment	Weight (%)
Research Paper: drafts and revised paper (Individual)	40
Project Plan & Progress (Team)	15
Lab Notebook (Team)	20
Engagement & Participation: Lab Citizenship, Safety, Pre-Labs, Homework, Reflections, Surveys	25

The final weighting for each category is subject to change at the discretion of the instructor; after all assignments have been graded, the instructor may change the weighting to raise final course grades. Please see Canvas for due dates/times for each assignment/quiz.

COMMUNICATION INSTRUCTION

Both written and oral communication are emphasized in this course. As a team, you will maintain a laboratory notebook to academic standards (see description below and in Assignments); your notebook will be evaluated at least twice during the semester. Ongoing verbal communication with your teammates during and outside of lab is essential for promoting a strong team dynamic and critical for completing the procedures in lab and analyzing the data.

We intend to use the overall quality of the laboratory notebook and your specific notebook entries to evaluate your effort. Describe all procedures that you perform in sufficient detail to repeat the experiment and record any raw data. Remember to describe any problems encountered or unexpected results. See [Electronic Lab Notebook \(ELN\)](#), [Assessing the Lab Notebook](#), and the rubric with [Lab Notebook: 1st Evaluation/Lab Notebook: 2nd Evaluation](#) ([%24CANVAS_OBJECT_REFERENCE%24/assignments/gdc9a2ccdd633428e7d9c33df2e051f0f](#)) for specific evaluation criteria. ***Each team will maintain an electronic laboratory notebook (ELN) using Google in Canvas:***

- ***The lab notebook is a chronological, real-time record of what happens during the lab.***
- ***Each team member is expected to make daily entries in the notebook during each lab.*** A single team member must not, for example, act as a recordkeeper by writing in the notebook while the others carry out the work. You may want to take turns writing the *Objectives/Daily Summary* for each lab day. Take turns recording information during lab and initial at the end of each entry by a different member of the team. *If multiple team members are making entries at the same time, make sure you do not cancel/type over each other's entries.* When you finish for the day, record the time on the final page.
- *It is absolutely critical that you record details such as WHO did WHAT (e.g., loading samples on the gel, setting up PCR, etc.) and LABELS on your samples.* You must have this information in your notebook to determine where a procedural error(s) occurred and to use the correct sample for that day's procedures.
- Remember, **do NOT "pre-write" objectives or methods in your notebook BEFORE you come to lab.**
- **Table of Contents updates, analysis / interpretation of data, and conclusions of findings can be entered in the ELN outside of the lab.**

As an individual, you will write a **Research Paper**; you will submit a draft of each section of the report and will have the opportunity to revise your work based on feedback from the instructor before submitting the [Final Paper](#) ([%24CANVAS_OBJECT_REFERENCE%24/assignments/g39f2f60d1ae4fe9319921a35e6fa87de](#)).

You are encouraged to make appointments with the peer consultants at the *Center for Academic and Professional Communication (CAPC)* for your communication assignments in this course. These consultants do not proofread or edit your work, but they will provide feedback on topics such as the organization of your paper, the coherence of your argument, and appropriate sentence structure.

NOTE: For this course you are NOT allowed to work with a consultant who is a biosciences major or to get any assistance with the content of the assignments. You can make an appointment at the Center's website: <https://cwovc.rice.edu/home> (<https://cwovc.rice.edu/home>). Please consult with Dr. Beason if you have any questions.

EVALUATION OF PERFORMANCE

We expect students to follow explicit instructions and to recall and apply previous training to each new project. Punctuality, safe conduct in the laboratory, and efficient completion of responsibilities will enter into the evaluation of overall performance. Read about our expectations and performance criteria in [Laboratory Citizenship](#) and see [BIOS_TLabs_LabCitizenshipFlyer.pdf](#) . Additionally, each of you must adhere to the rules/guidelines in [Lab Safety](#).

HONOR CODE POLICY

All students will be held to the standards of the Rice Honor Code, a code that you pledged to honor when you matriculated at this institution. Consult the Honor System Handbook at <http://honor.rice.edu/honor-system-handbook/> (<http://honor.rice.edu/honor-system-handbook/>) for details about this code and how it is administered. This handbook outlines the University's expectations for the integrity of your academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process.

Please read the [Honor Code Policy](#) for BIOS 311. When you turn in an assignment, you must be able to make the statement, "On my honor, I have neither given nor received any unauthorized aid on this assignment." This pledge applies to notebook entries, pre-lab quizzes/exercises, homework assignments, section drafts, and the final paper. For detailed information, see the link on the course web site.

All pre-laboratory quizzes, homework, reflections, lab notebook, and writing assignments must represent your individual work unless specified otherwise. You will perform lab work as teams and are

encouraged to share responsibilities of data collection and analysis. While you may discuss data calculations with teammates, when you begin writing the paper, you should not work together on or share ideas about specific information to include in text, formatting and/or content of figures and tables. The Writing Center's mentors may be consulted about the clarity and quality of your writing; however, those mentors should focus on your writing without providing comments about scientific content. Additional honor code details for written assignments are included with the assignment. The following applies to all written assignments: No one is to have access to any other student's paper for this course, from this semester or from any previous semester. When assignments are prepared by teams, no team is allowed access to another person's or another team's written assignment as described above. Thus, it is both a violation to provide or post material not provided by the instructor or to use similar material for your own benefit. If you find that previous papers are posted on the web, kept in college libraries, or available in any other form, please report the suspected violation to the honor council.

PRIVACY and CONFIDENTIALITY

- In line with **FERPA REQUIREMENTS** (https://registrar.rice.edu/facstaff/ferpa_FAQs/), recorded classroom discussions involving students will be available only to students officially registered and enrolled in the class. If you have concerns about appearing on these recordings, please contact me ahead of time.
- I may desire or plan to use recordings from this class for another educational purpose. If this situation arises, and in line with **FERPA REQUIREMENTS** (https://registrar.rice.edu/facstaff/ferpa_FAQs/), I will ask you to consider signing individualized consent **FORMS** (https://registrar.rice.edu/sites/g/files/bxs751/f/Lecture_Capture_Consent-Release.pdf). Students who do not provide written consent will be de-identified and/or omitted from all recordings.

STUDENTS WITH DISABILITIES

Course material will be delivered either digitally (online or email), in book format, or in person and may be visual (written documents, slides, videos, etc.), audio (videos, presentations, discussions), or interactive (questions, discussions, clickers, etc.). Course work will require answering questions online, safely performing laboratory procedures, writing in lab notebooks, typing papers, reading written materials, discussing material with peers, and may include light lifting and sitting for extended periods of time. Laboratory sessions will not be available online.

Any student with a documented or suspected disability needing academic adjustments or accommodations should 1) make sure this documentation is on file with the Disability Resource Center (Allen Center, Room 111 / adarice@rice.edu (<mailto:adarice@rice.edu>) / x5841) to determine the accommodations you need; and 2) meet with the instructor in person or by email before the first day of class to discuss your accommodation needs – all discussions will remain confidential.

TITLE IX RESPONSIBLE EMPLOYEE NOTIFICATION

Rice University cares about your wellbeing and safety. Rice encourages any student who has experienced an incident of harassment, pregnancy discrimination or gender discrimination or relationship, sexual, or other forms interpersonal violence to seek support through The SAFE Office. Students should be aware when seeking support on campus that most employees, including myself, as the instructor/TA, are required by Title IX to disclose all incidents of non-consensual interpersonal behaviors to Title IX professionals on campus who can act to support that student and meet their needs. For more information, please visit safe.rice.edu (<http://safe.rice.edu/>) or [email titleixsupport@rice.edu](mailto:titleixsupport@rice.edu) (<mailto:titleixsupport@rice.edu>). For more information about Title IX, please contact Title IX Compliance Officer [Richard Baker](mailto:richard.a.baker@rice.edu). (<mailto:richard.a.baker@rice.edu>)

DEAN OF UNDERGRADUATES GUIDELINES FOR RELIGIOUS ACCOMMODATIONS

Both Rice's policy of non-discrimination on the basis of religion and our core values of diversity and inclusion require instructors to make reasonable accommodations to help students avoid negative academic consequences when their religious obligations conflict with academic requirements. Every reasonable effort should be made to allow members of the university community to observe their religious holidays without jeopardizing the fulfillment of their academic obligations. Absence from classes or examinations for religious reasons does not relieve students from responsibility for any part of the course work required during the period of absence. You are obligated to provide me with reasonable notice of the dates of religious holidays on which you will be absent.

Information contained in this course syllabus, other than the absence policies, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.

Course Summary:

Date	Details	
Tue Jan 26, 2021	 Constructive and Destructive Group Behaviors https://canvas.rice.edu/courses/37361/assignments/177749 (BIOS 311 001 Sp21)	due by 11:59pm
Wed Jan 27, 2021	 Constructive and Destructive Group Behaviors https://canvas.rice.edu/courses/37361/assignments/177749 (BIOS 311 002 Sp21)	due by 11:59pm
	 Group Concept Map https://canvas.rice.edu/courses/37361/assignments/177764 (BIOS 311 001 Sp21)	due by 11:59pm
Thu Jan 28, 2021	 Group Concept Map https://canvas.rice.edu/courses/37361/assignments/177764 (BIOS 311 002 Sp21)	due by 11:59pm
	 Lab Safety (Multiple Choice) https://canvas.rice.edu/courses/37361/assignments/177756	due by 11:59pm
	 Lab Safety (Short Answer) https://canvas.rice.edu/courses/37361/assignments/177753	due by 11:59pm
Fri Jan 29, 2021	 Reflection 1: Semester Start https://canvas.rice.edu/courses/37361/assignments/177747	due by 11:59pm
	 Project Choice https://canvas.rice.edu/courses/37361/assignments/177769	due by 11:59pm
Mon Feb 1, 2021	 Group Contract https://canvas.rice.edu/courses/37361/assignments/177765	due by 11:59pm
	 Pre-Lab 1: Introduction and	

Wed Feb 3, 2021	Bacterial Streak Plate (https://canvas.rice.edu/courses/37361/assignments/177754) (BIOS 311 001 Sp21)	due by 1pm
	 Project Question/Problem (https://canvas.rice.edu/courses/37361/assignments/177770) (BIOS 311 002 Sp21)	due by 11:59pm
Thu Feb 4, 2021	 Pre-Lab 1: Introduction and Bacterial Streak Plate (https://canvas.rice.edu/courses/37361/assignments/177754) (BIOS 311 002 Sp21)	due by 1pm
	 Project Question/Problem (https://canvas.rice.edu/courses/37361/assignments/177770) (BIOS 311 001 Sp21)	due by 11:59pm
Fri Feb 5, 2021	 Team Name (https://canvas.rice.edu/courses/37361/assignments/182130)	due by 11:59pm
Mon Feb 8, 2021	 Calculations for Preparation of Buffers (https://canvas.rice.edu/courses/37361/assignments/177759)	due by 11:59pm
Wed Feb 10, 2021	 Pre-Lab 2: Protein Expression and Purification (https://canvas.rice.edu/courses/37361/assignments/177752) (BIOS 311 001 Sp21)	due by 1pm
Thu Feb 11, 2021	 Pre-Lab 2: Protein Expression and Purification (https://canvas.rice.edu/courses/37361/assignments/177752) (BIOS 311 002 Sp21)	due by 1pm
Mon Feb 22, 2021	 Draft 1: Introduction (https://canvas.rice.edu/courses/37361/assignments/177760)	due by 11:59pm
Thu Feb 25, 2021	 Pre-Lab 3: Protein Determination and SDS-PAGE (https://canvas.rice.edu/courses/37361/assignments/177755) (BIOS 311 002 Sp21)	due by 1pm

Wed Mar 3, 2021	 <u>Pre-Lab 3: Protein Determination and SDS-PAGE</u> (https://canvas.rice.edu/courses/37361/assignments/177755) (BIOS 311 001 Sp21)	due by 1pm
Fri Mar 5, 2021	 <u>Reflection 2: Lab Experiences and Framing</u> (https://canvas.rice.edu/courses/37361/assignments/177748)	due by 11:59pm
Fri Mar 12, 2021	 <u>Experimental Plan and Timeline</u> (https://canvas.rice.edu/courses/37361/assignments/177763)	due by 11:59pm
Fri Mar 19, 2021	 <u>Lab Notebook: 1st Evaluation</u> (https://canvas.rice.edu/courses/37361/assignments/177767)	due by 11:59pm
Mon Mar 22, 2021	 <u>Draft 2: Materials and Methods</u> (https://canvas.rice.edu/courses/37361/assignments/177761)	due by 11:59pm
Tue Mar 23, 2021	 <u>Pre-Lab 3: Writing a Research Paper</u> (https://canvas.rice.edu/courses/37361/assignments/177757)	due by 11:59pm
Fri Apr 2, 2021	 <u>Reflection 3: Methodology and Evaluation / Synthesis</u> (https://canvas.rice.edu/courses/37361/assignments/177746)	due by 11:59pm
Fri Apr 16, 2021	 <u>Draft 3: Research Progress & Abstract</u> (https://canvas.rice.edu/courses/37361/assignments/177762)	due by 11:59pm
Tue Apr 27, 2021	 <u>Project Summary Team Presentation</u> (https://canvas.rice.edu/courses/37361/assignments/177772) (BIOS 311 001 Sp21)	due by 11:59pm
Wed Apr 28, 2021	 <u>Project Summary Team Presentation</u> (https://canvas.rice.edu/courses/37361/assignments/177772) (BIOS 311 002 Sp21)	due by 11:59pm

**Reflection 4: Communication and Semester End**<https://canvas.rice.edu/courses/37361/assignments/177751>

due by 11:59pm

Fri Apr 30, 2021

**Lab Notebook: 2nd Evaluation**<https://canvas.rice.edu/courses/37361/assignments/177768>

due by 11:59pm

**Project Summary**<https://canvas.rice.edu/courses/37361/assignments/177771>

due by 11:59pm

Sun May 9, 2021

**Research Paper**<https://canvas.rice.edu/courses/37361/assignments/177773>

due by 11:59pm

**Reflection 5: Revisions for the Final Paper**<https://canvas.rice.edu/courses/37361/assignments/177758>

due by 11:59pm

Wed May 12, 2021

**The LCAS Survey**<https://canvas.rice.edu/courses/37361/assignments/177750>

due by 11:59pm

**Lab Citizenship**<https://canvas.rice.edu/courses/37361/assignments/177766>